

Document Title: Valves, adjusting	Function Group: 214	Information Type: Service Information	Date: 2015/3/9 0
Profile: EXC, EC140D LM [GB]			

Valves, adjusting

Op nbr 214-012

[885812 Timing tool](#)

[9998681 Rotation tool](#)

! WARNING

Risk of burns - stop the diesel engine and allow it to cool down before starting any work.

NOTICE

Never adjust the valves with the engine running as the valves may strike the piston and cause serious damage.

NOTICE

Always cover open air connections with a plastic bag and rubber bands. Gravel, dust and other particles in these connections may result in engine failure!

1. Place the machine in service position B. See [091 Service positions](#)
2. Open the engine hood.
3. Remove the heating guard



V1102523

Figure 1

4. Remove the screws and put aside the crankcase ventilation duct from the engine.

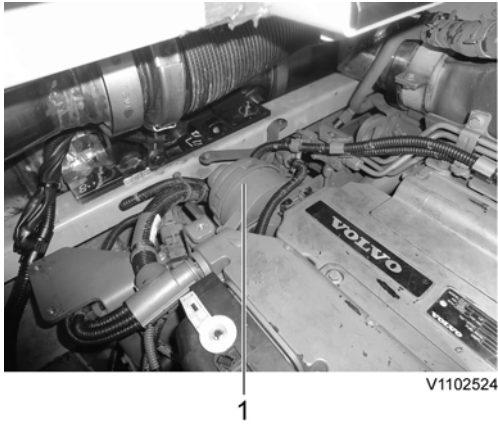


Figure 2

1. Crankcase ventilation duct

5. Disconnect the wire-harness connectors

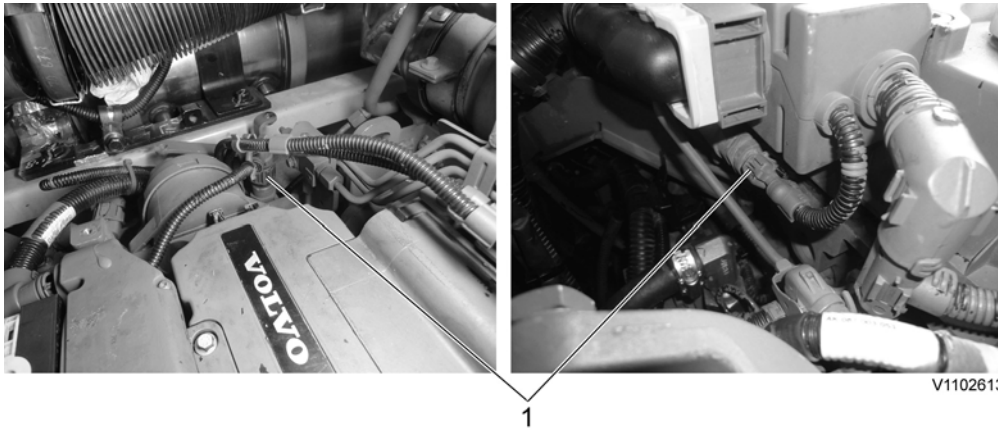


Figure 3

1. Connector

6. Disconnect the junction box connector and pull apart the cover plates

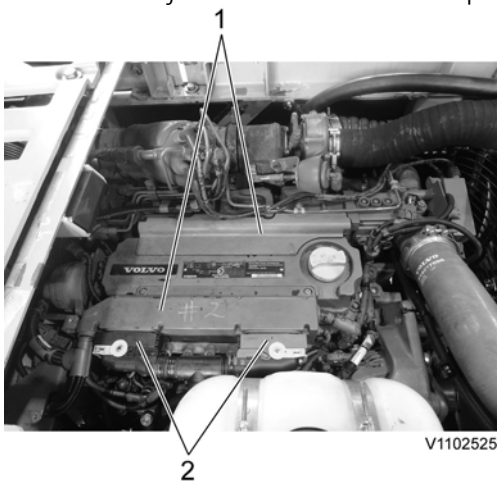


Figure 4

1. Cover plate
2. Junction box connector

7. Disconnect the connector.

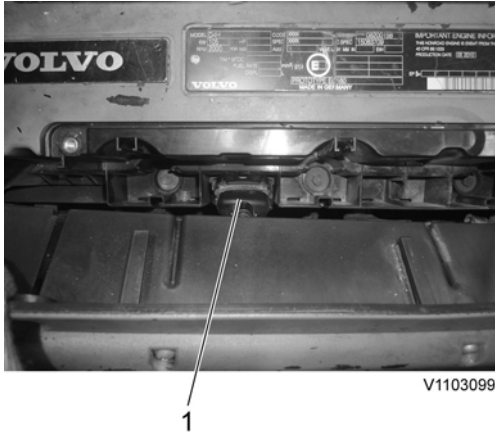


Figure 5

1. Connector

NOTICE

Clean round the valve cover, intercooler and turbo to avoid oil residue and the like from getting into the engine while work is in progress.

8. Remove the valve cover.

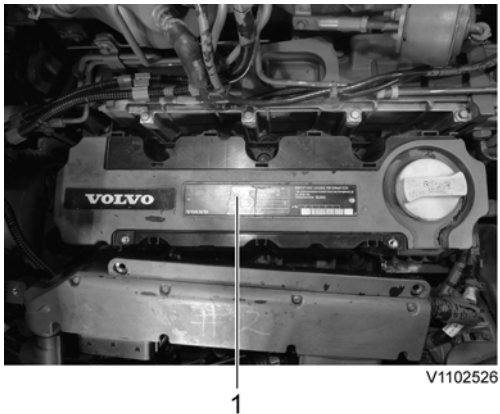


Figure 6

1. Valve cover
9. Open the side door on the right side of the machine.
10. Remove screws and put away the cover between the engine room and the pump room.



V1111164

Figure 7

1. Cover plate

11. Remove the gear cover.



V1111208

Figure 8

1. Gear cover

12. Install the engine rotating tool.

NOTE!

The teeth of the rotation tool must mesh fully with the teeth of the flywheel gear.



V1111209

Figure 9

1. 9998681 Rotation tool

13. Setting engine to valve overlap

Turn the engine using the rotation tool until the valve overlap of cylinder 1 is reached.

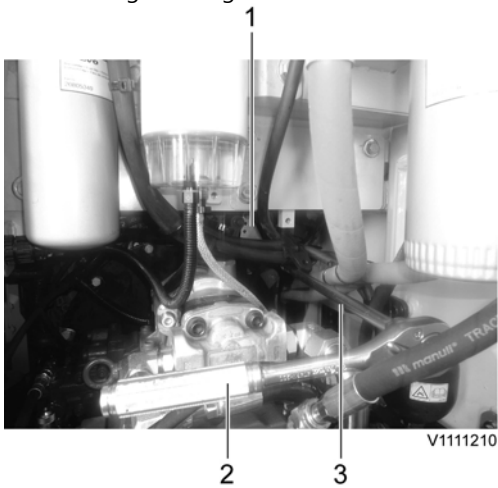


Figure 10

1. 9998681 Rotation tool
2. Handle
3. Extension bar

14. Crank the engine, clockwise, to a position where the valves on the cylinder number 1 (closest to the flywheel side) overlap.

Overlapping means that the exhaust valve is about to open and the inlet valve is about to close. In this position is should not be possible to rotate any of the push rods by hands for the cylinder in question.

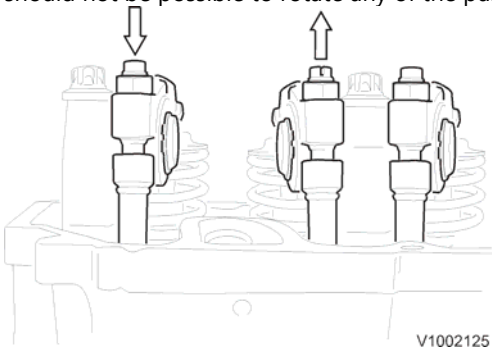


Figure 11
Overlapping

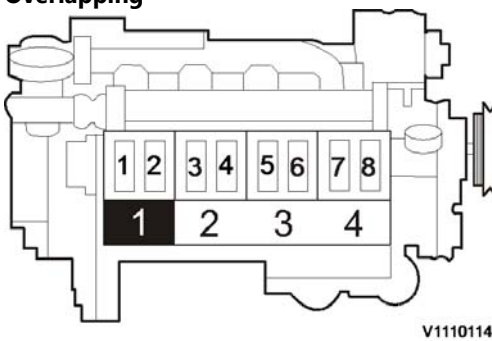


Figure 12

- 1, 3, 5, 7 are exhaust valves
2, 4, 6, 8 are inlet valves

15. Adjust the valve clearance for each cylinder according to the black markings in the figure. Procedure for adjusting:

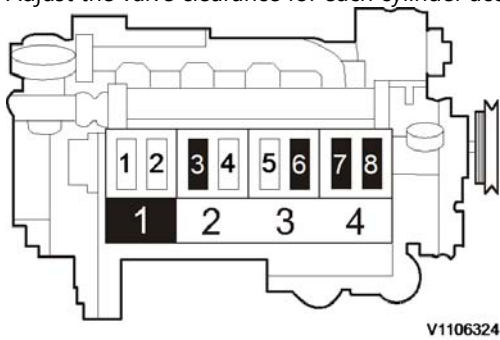


Figure 13
Setting schematic overlap cylinder 1 (located on the flywheel side)

1. Loosen the adjusting screw's lock bolt on the rocker arm.

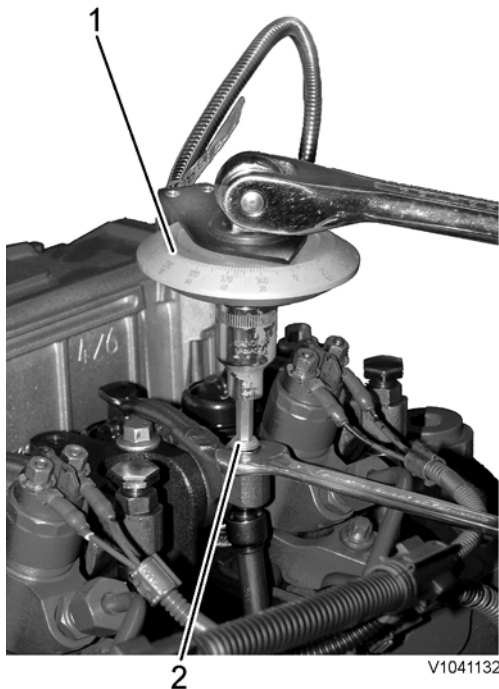


Figure 14

1. 885812 Timing tool
 2. Adjusting screw
2. Install the protractor on the adjusting screw.
 3. Turn the adjusting screw until zero clearance is obtained between rocker arm and valve. Reset the protractor to zero.
 4. Turn the adjusting screw counterclockwise 75° for inlet valve and 120° for exhaust valve.
 5. Hold the adjusting screw and tighten the lock nut at the same time. Tightening torque: see [210 Engine, tighten torques](#)
16. Rotate the crankshaft another full turn until the valves for cylinder 4 overlap. Adjust the valve clearance for each cylinder according to the black markings in the figure.

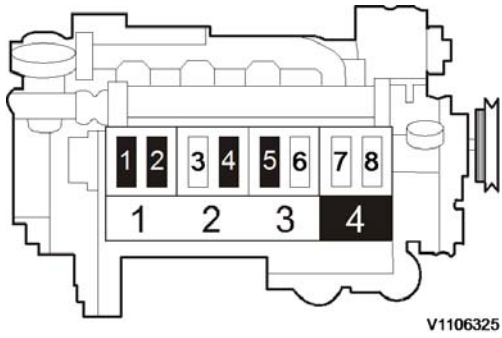


Figure 15
Setting schematic overlap cylinder 4

Assembly

17. For assembly, reverse disassembly procedure.

NOTE!

Do not reuse the O-rings and gasket.

18. After the completion of the work, start the engine and check for leaks and operating condition.

Document Title: Oil level sensor, changing	Function Group: 217	Information Type: Service Information	Date: 2015/3/9 0
Profile: EXC, EC140D LM [GB]			

Oil level sensor, changing

Op nbr 217-005



Risk of burns - stop the diesel engine and allow it to cool down before starting any work.

NOTE!

Cable ties and clamps that secure hoses and electrical wiring must be removed and then replaced when installing.

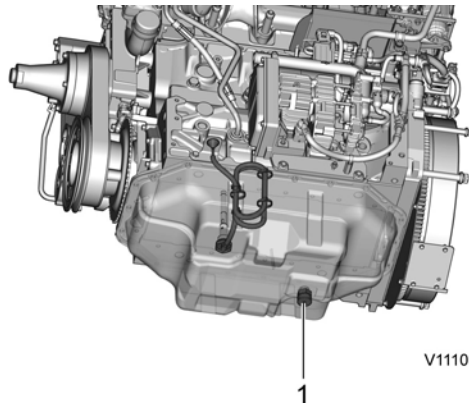
1. Place the machine in the service position B. See [091 Service positions](#)
2. Turn the battery disconnect switch to off position.
3. Remove the engine room under covers.



V1110118

Figure 1

4. Open the oil drain valve cap and install the engine oil drain hose and then allow the oil to drain from the engine into a suitable collection container.



V1110119

Figure 2

1. Engine oil drain valve cap
5. Disconnect wire harness connector and then remove all clamps and ties.

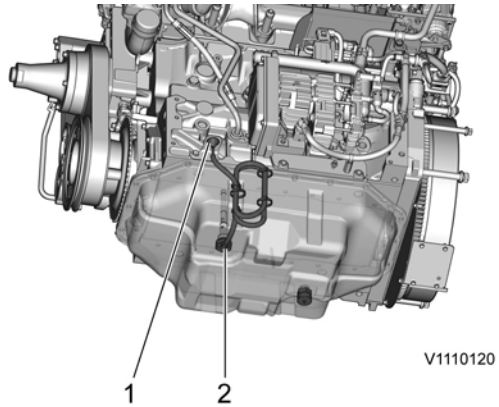


Figure 3

1. Wire harness connector
2. Oil level sensor
6. Remove the oil level sensor and replace it with a new one.
7. Restore the machine to operating condition.
8. Fill the engine oil through the engine oil filling port

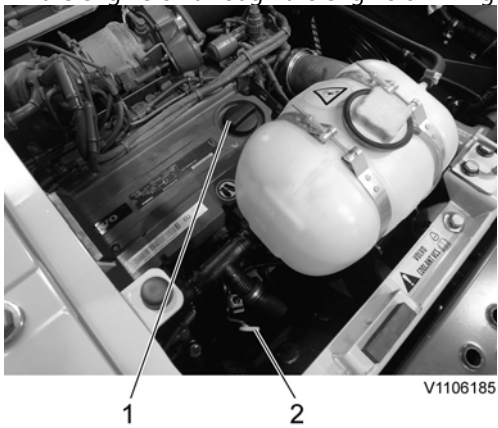


Figure 4

1. Engine oil filling port cap
2. Dipstick gauge

NOTE!

Engine Oil capacity: see [030 Specification, filling capacities](#).

9. Set the ignition switch to "ON" position and check the oil level on the I-ECU.



V1050080

Figure 5

10. Install the engine room under covers.

Document Title: Lubrication system, component locations	Function Group: 220	Information Type: Service Information	Date: 2015/3/9 0
Profile: EXC, EC140D LM [GB]			

Lubrication system, component locations

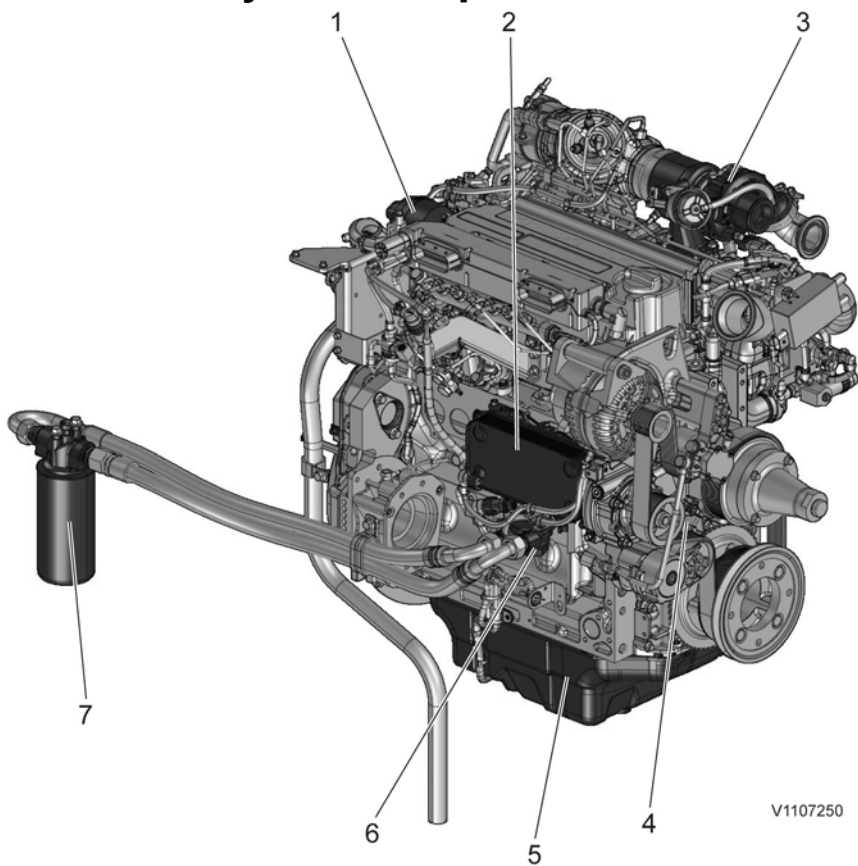


Figure 1

1. Crankcase ventilation duct
2. Engine oil cooler
3. Turbocharger
4. Oil pump
5. Oil pan
6. Engine oil remote port
7. Engine oil filter

Document Title: Lubrication oil pressure, checking with pressure gauge	Function Group: 221	Information Type: Service Information	Date: 2015/3/9 0
Profile: EXC, EC140D LM [GB]			

Lubrication oil pressure, checking with pressure gauge

Op nbr 221-022

[11666052 Pressure gauge](#)

[14290266 Hose](#)

[15018967 Testing nipple](#)

NOTE!

The check should be performed with the engine at operating temperature.

1. Place the machine in service position B, see [091 Service positions](#).
2. Turn off the electric power with the battery disconnect switch.
3. Remove the engine room under covers.
4. Remove the engine oil port under the oil cooler.

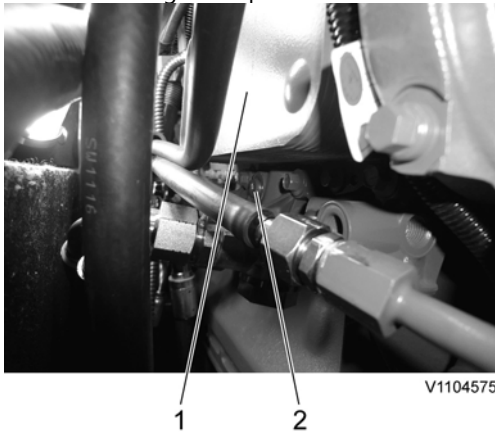
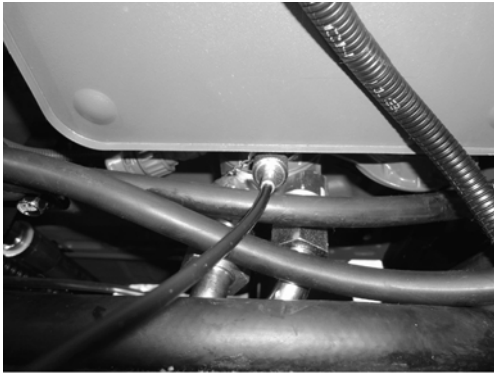


Figure 1

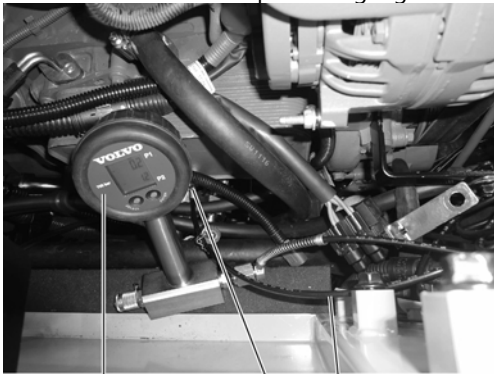
1. Engine oil cooler
 2. Port
5. Install the nipple.



V1104576

Figure 2

6. Install the hose and the pressure gauge



V1104577

Figure 3

1. Pressure gauge
2. Testing nipple
3. Hose

7. Start the engine and warm up to operating temperature.
8. Check the oil pressure, see [220 Lubrication system, specifications](#). Compare the measured value with that which was shown by the VcadsPro test 28407-3.
9. Restore the machine to the operating condition.

Document Title: Fuel system, component location	Function Group: 230	Information Type: Service Information	Date: 2015/3/9 0
Profile: EXC, EC140D LM [GB]			

Fuel system, component location

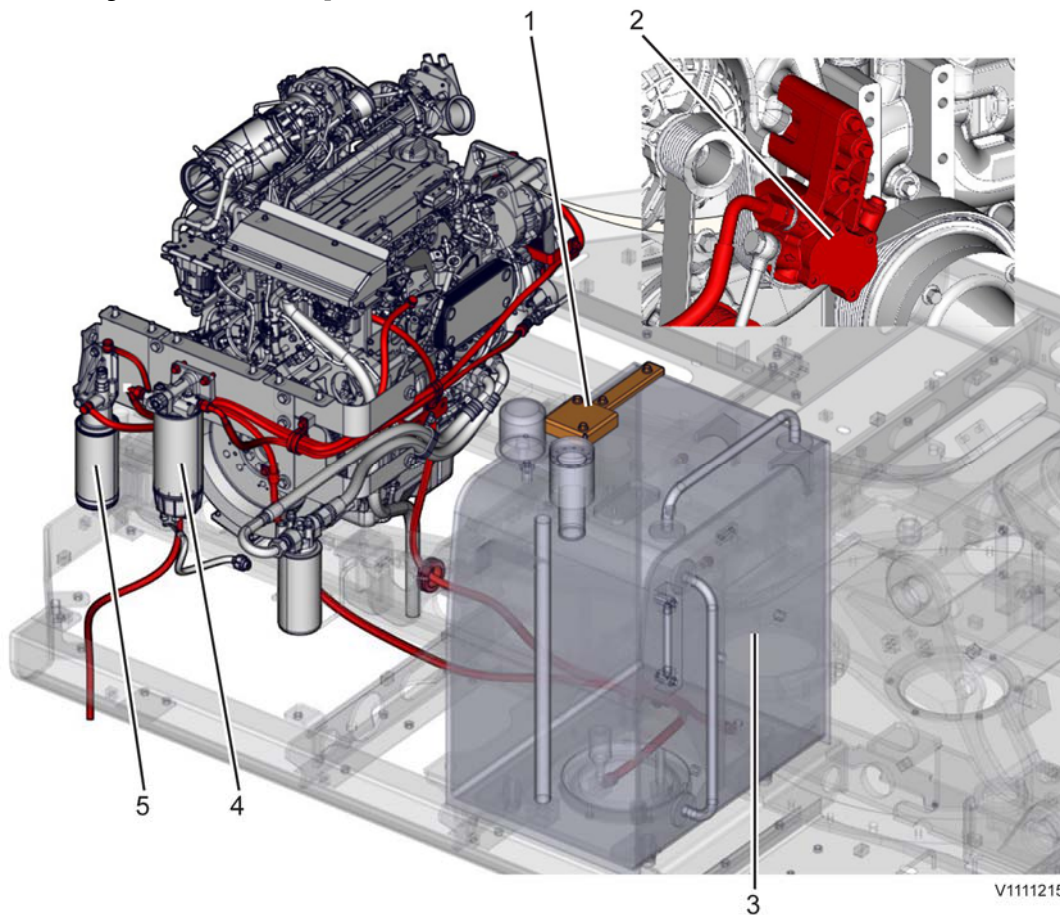


Figure 1

1. Fuel level sensor
2. Fuel pump
3. Fuel tank
4. Water separator filter element
5. Fuel filter

Description

- [230 Fuel system description](#)

Document Title: Carbon monoxide in fuel system, check	Function Group: 230	Information Type: Service Information	Date: 2015/3/9 0
Profile: EXC, EC140D LM [GB]			

Carbon monoxide in fuel system, check

Carbon monoxide in fuel tank, check with carbon monoxide tester

Op nbr 230-001

[9808038 Leak detector](#)

1. Run the engine until it is warm.
2. Dismantle 9808038 Leak detector.
Lubricate the O-rings with silicone grease or clean vaseline.
3. Fill both chambers with reaction fluid up to the indicated line.
4. Cover the inlet hole at the same time as the carbon monoxide tester is assembled so that no fluid is pressed out.
NOTE!
The carbon monoxide tester and its fluids may not be exposed to cigarette smoke, exhausts, or similar.
Conduct the test on a machine that is not recently refuelled.
5. Rev up the engine several times.
6. Turn off the engine and open the tank cap.
Place 9808038 Leak detector over the tank opening and pump 3–5 times on the rubber bulb to suck in air from the tank. Wait 10–15 seconds to see if the reaction fluid reacts.
NOTE!
Fuel may not be sucked into the carbon monoxide tester.
If the reaction fluid in 9808038 Leak detector changes colour, this indicates that there is carbon monoxide in the tank.
Very small quantities of carbon monoxide are often present in the machine's systems, that is why the measurement should be repeated if the first measurement generates a reaction.
7. Suck fresh air into 9808038 Leak detector by pumping a few times on the bulb. Pump until the reaction fluid has returned to its original colour.
8. Ventilate the air above the filler hole to the tank and repeat the test.
NOTE!
Do not blow with exhaled air as it contain carbon dioxide.
9. Reinstall the tank cap.

Document Title: Feed pump, checking feed pressure	Function Group: 233	Information Type: Service Information	Date: 2015/3/9 0
Profile: EXC, EC140D LM [GB]			

Feed pump, checking feed pressure

Op nbr 233-004

[15018967 Testing nipple](#)

[14290266 Hose](#)

[11666052 Pressure gauge](#)



WARNING

High pressure. Wait 30 seconds after switching off the engine before working on the fuel system.

NOTICE

Maintain greatest possible cleanliness when working on the fuel system.

Testing conditions

1. Batteries are in good conditions and fully charged.
2. Abnormal fuel feed pressure value with VCADS Pro. See [030 Fuel pressure specifications](#).

Pressure checking procedures

1. Place the machine in service position B, see [091 Service positions](#).
2. Turn off the electric power with the battery disconnect switch.
3. Open the engine hood.
4. Disconnect the wire-harness connector.

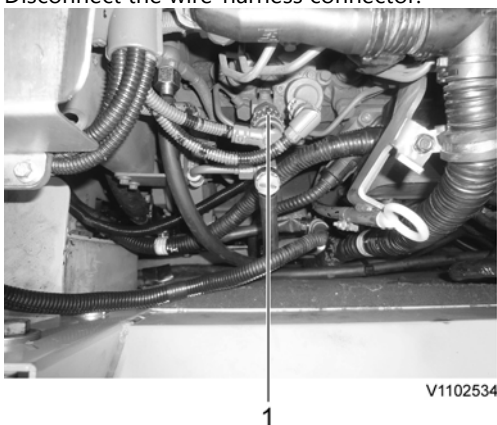


Figure 1

1. Wire-harness connector

Thank you very much for reading.

This is part of the demo page.

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